ON AN APOCYNACEOUS PLANT YIELDING LARGE EDIBLE TUBERS.

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(Plates xxxiv.-xxxv.)

Parsonsia Paddisoni, n.sp.

A glabrous woody climber. Leaves opposite, on a petiole from 6 to 8 lines long, obovate, elliptical-lanceolate, abruptly acuminate, glabrous on both sides, upper surface dark green, venation about equally prominent on both sides, reticulations perhaps more distinct on the upper surface, under side pale-coloured, margins recurved, about 3 to 4 inches long.

Cymes axillary, only in one axil of the pair of leaves, peduncles pubescent, shorter than the leaves. Calyx-segments equal, lanceolate, subulate, ribbed, pubescent, 1 to 1½ lines long, margins hyaline. Corolla-tube shorter than the calyx, constricted at the attachment of the stamens, lobes glabrous, about 2 lines long, the right edge imbricate. Filaments slender, pubescent, slightly twisted under the anthers; anthers wholly exserted, acuminate, forming a cylinder nearly as long as the corolla, without dorsal appendages, basal lobes long, incurved at the ends.

Fruits 5 to 7 inches long, follicles thin, seeds attenuate into a short beak at the hilum, with a coma over 1 inch long.

Hab.—New Angledool, N.S.W. (A. Paddison).

I have failed to obtain specimens of the original *P. lanceolata*, R.Br., for comparison, so have drawn the distinctions from Bentham's description (B. Fl. Vol. iv. p. 318).

If it were not for the imbrication of the petals and the leaves it could be placed as a variety of *Lyonsia eucalyptifolia*, F.v.M., as it certainly has many features common with that species, particularly the appearance of the inflorescence and the anthers.

It differs from *P. lanceolata*, R.Br., in its axillary cymes, shape of leaves, and calyx-lobes being equal.

It is very probable that two species are included under that species as described in B. Fl. iv. p. 318.

My attention was first drawn to this plant by Mr. A. Paddison, of New Angledool, who sent for identification a large tuber or "yam" weighing about 10lbs., stating that similar yams were eaten both by settlers and aborigines. After receiving specimens of leaves, flowers and fruits, it was found that the plant was referable to *Parsonsia*, and not *Lyonsia*, as a preliminary examination of the first fragments of leaves and flowers received had led me to suspect, as mentioned by me in the Abstract of Proceedings for June.

The average height of the plant is about from 10 to 15 feet. This, however, is very difficult to determine satisfactorily, inasmuch as the height depends upon the height of the tree around which it is climbing.

Stock are very fond of the leaves, so that this plant should be ranked as a fodder.

The stem is about one inch in diameter a foot or so above the ground, the bark being of quite a corky nature.

The presence of tubers in Parsonsia is quite without record as far as I have been able to ascertain. They are common enough in Marsdenia, but it would appear that no one has yet associated

them with Parsonsia, or for the matter of that with any Apocynaceous plant.

The tubers are known locally as "Native Yams," a very good descriptive name as they (particularly the larger ones) very much resemble in shape and outward appearance the "Yam" of the South Sea Islands, obtained from species of the family Dioscorideæ.

The "skin" is of an earthy colour, similar to that of a potato or a native truffle. The interior is composed of a whitish substance, for the chemical analysis of which I am indebted to my colleague, Mr. H. G. Smith, F.C.S.

The root fibres are distinctly seen in a transverse section, and in the smaller yams are arranged in bundles in concentric circles similar to the protecting wires in a submarine telegraph cable, whilst in the larger ones these are distributed irregularly. As the tubers are eaten by both colonists and aboriginals, it was thought advisable to place on record a chemical analysis. The results are disappointing, as it was hoped that it would be possible to announce the discovery of a more nutritive article of diet. However, it is of some importance if in these tubers the inhabitants of the dry interior have a vegetable "standby" in times of drought when it is impossible to grow the ordinary domestic vegetables. Under cultivation they would probably improve in quality.

In a raw state they have not that glutinous character which is offered by an Island yam when freshly cut. They taste very much like a turnip, both in the raw and cooked condition. The colour and consistency of the largest specimens resemble those of the common mangel-wurzel.

Mr. Paddison, writing to me about these tubers, states:—"As you are interested in the above, perhaps a few words relative to the manner of growth and locality of this plant may not be out of place. As I have before remarked, it is a vine, generally found growing at the foot of and twisting itself around some small tree, and that tree in nine cases out of ten a 'wilga,' *Geijera parviflora*, Lindl. After receiving your letter, a Mr. A. S. Read of this town and

myself started out to find a plant. We discovered one about 400 yards from the township, and forthwith set to work to dig out the yams. We dug a hole about four feet in diameter around the plant and wilga. Keeping well down around the circumference we soon had the yams, or most of them, exposed to view. Underneath the ground they grow from the plant in exactly the same manner as the potato, the largest close to the parent root, and the smaller at the end of the root fibres. The top one was 4 inches from the surface, and the deepest that we could find was 21 inches from the surface. We dug up all that we could find, carried them home, and weighed each one separately, 29 yams in all. Following are the weights :—12¼, 10½, 9, 7¾, 7, 6, 5½ (2), 4½, 4¼, 3¾, 2½ (2), 2 (5), 1¾, 1½ (2), 1¼ (2), 1 (2), ½, ¼, and ⅛ (2) lbs., making a total of 101¼lbs. for the 29.

"Seeing that we have practically had a drought here for the last four years, I have no doubt that under favourable circumstances a yield of from 150 to 200 lbs. might be found.

"As, perhaps, this yield (101¼ lbs.) may appear incredible to anyone not acquainted with the plant, I have named this gentleman, Mr. Read, so that any person inclined to doubt may at any time communicate with him. He is known to the Curator of the Australian Museum, as he often sends birds, &c., to be identified; four other persons also saw them weighed. When I was first shown the plant I did not believe that such large tubers grew underneath, therefore I can understand others doing likewise.

"Another curious thing about them is that, although one end of the yam may be damaged by bandicoots, bilbies, &c., it does not hurt the whole. The part immediately around the bitten part will decay, but the rest of the yam is not affected.

"About the second one from the top is the largest in each case, with its sides very much gnarled with age; the others have a fresher and smoother looking skin."

A chemical analysis of one of the tubers shows this "article of diet" to be somewhat inferior as a food substance, being deficient in nitrogenous substances and carbonaceous principles.

The bundles of root fibres run parallel to the outer edge of the tuber, the distance between the respective bundles becoming greater as the root expands in size, and contracting again at each end. These root fibres account for the comparatively high percentage of crude fibre. The amount of mineral matter is also large, and contains a large percentage of the chlorides; the other constituents usually found in similar ashes were present as phosphoric and sulphuric acids, lime, magnesia and the alkalies, with a good percentage of potassium.

Only a small quantity of starch is present, as only a few granules were indicated by iodine. These granules are quite spherical and vary much in size as ranging from $\frac{1}{30000}$ to $\frac{1}{2580}$ of an inch, the largest number being about $\frac{1}{10000}$ of an inch. Only those granules stained blue were measured.

A proximate determination of the constituents was not made as the general value is so low. Although only ·77 per cent. of nitrogenous substances, calculated as albuminoids, was present, yet it it is probable that even some of this nitrogen is not so combined. Duplicate results were made. A fair section was taken for analysis through the centre of a tuber and the mean of the result stated. The results show that only 4½ per cent. of carbonaceous principles is present—an exceedingly low result.

The general constitution is as follows :—

Water	90·774 per cent.
Nitrogenous substance*	0·770 ,,
Starch and other carbonaceous principles	4·564 ,,
Crude fibre (ash free)	1·900 ,,
Mineral matter†	1·992 ,,
	100·000

I have to acknowledge my indebtedness to Mr. S. J. Johnston, B.A., for the measurements of the starch granules, and also to Mr. M. F. Connelly for the photographs illustrating this paper.

* Equal to 0·123 per cent. nitrogen.

† Contains 18 per cent. chlorine.

EXPLANATION OF PLATES.

Plate xxxiv.

Fig. 1—Portion of twining stem.
Fig. 2—Branchlet with inflorescence.
Fig. 3—Individual flower (enlarged).
Fig. 4—Calyx showing hypogynous scales (enlarged).
Fig. 5—Stamens (enlarged).
Fig. 6—Fruit.
Fig. 7—Seed.

Plate xxxv.

Fig. 8—Tuber weighing 10½lbs.
Fig. 9—Tuber in section.

The text figure (p. 385) is reproduced from a photograph showing a plant of *Parsonsia Paddisoni* twining round a dead tree about 20 feet high.